REMARKS

This communication is being filed in response to the final Office Action having a mailing date of February 8, 2005. Claims 1-22 remain pending in the application with this filing. In the final Office Action, the Examiner continued to reject claims 1, 6-8, 11-13, and 16-22 under 35 U.S.C. § 102(b) as being anticipated by Betts (U.S. Patent No. 5,812,537). Claims 2-5, 9-10, and 14-15 remain rejected under 35 U.S.C. § 103(a) as being obvious over the combination of Betts and Agazzi (U.S. Patent No. 4,669,116). For the reasons set forth below, the applicant kindly requests the Examiner to reconsider.

I. Summary of the Applicant's Previous Argument(s)

In the Amendment filed on June 15, 2004 (refiled on October 2004 along with a petition), the applicant argued on pages 9-10 in the Remarks that his embodiment(s) involves an echo canceller 310 that is coupled to an output terminal of a transmitter 306. *See, e.g.*, Figure 3 and the accompanying description from the present application. The echo cancellation of this embodiment is thus based at least in part on an analog output signal that is generated by the transmitter 306 (and which is provided as an input to the echo canceller 310 by way of an analog-to-digital converter 312) and which includes characteristics that are associated with nonlinearities introduced by the transmitter 306. *See, e.g.*, bottom paragraph on page 11 of the Remarks from the June 15, 2004 Amendment.

In contrast, the applicant argued that the echo canceller 650 in Figure 3 of Betts is similar to a prior art echo canceller 210 shown in Figure 2 of the present application. That is, the echo canceller 650 of Betts is coupled to an input terminal of the transmitter so that both the transmitter and the echo canceller 650 receive substantially the same input signal, and therefore, the input signal to the echo canceller 650 does not and cannot have the linearities introduced by the transmitter 100. *See, e.g.*, bottom paragraph on page 10 of the Remarks from the June 15, 2004 Amendment.

II. The Examiner's Reasons for Rejection in the Present Office Action

On page 8, paragraph 5 of the final Office Action, the Examiner disagreed with the applicant's arguments. More specifically, the Examiner directed the applicant's attention to Figure 3; column 4, line 66 to column 5, line 8; and column 5, lines 24-25 of Betts, and argued

that Betts is indeed based on an analog output signal that is generated by the transmitter and which includes characteristics that are associated with nonlinearities introduced by the transmitter. To support his position that the prior art is similar to the embodiment of Figure 3 of the present application, the Examiner quoted the following relevant language from Betts:

> "an an[a]log line signal, fs(t), *transmitted from far-end modem, e.g., PSTN modem 300*, is received and is directed to bandpass filter (BPF) 620. This signal is referred to as the 'far-end data signal,' and utilizes the same frequency band as the transmitted signals, ns(t), *i.e.*, cellular modem 100 is a full duplex modem. Bandpass filter 620 removes energy outside the signal passband from the far-end data signal 612 to form signal 621, which is then converted to digital form by analog-to-digital (A/D) converter 625 to form received signal rs(t)....To this end, far-end *echo canceller 650 processes received signal rs(t)*." (Emphasis ours).

The above language has been quoted correctly by the Examiner. However, as indicated by the italicized and underlined text above, a relevant feature to note in Betts is that the signal rs(t), which is provided to the echo canceller 650, is being provided from the far-end modem 300 (*i.e.*, a second, different modem) rather than being provided from the modem 100 that includes the echo canceller 650.

As shown clearly in Figure 3 of Betts, the output signal ns(t) generated by the modem 100 (more specifically, the output of the transmitter 605 of the modem 100) is provided to a hybrid 610. The hybrid 610, as known by persons skilled in the art, is any suitable type of communication network having a combination of hardwire, wireless, optical, or other types of communication links. The hybrid 610 then provides the output signal ns(t) to a mobile phone 140. The signal ns(t) is NOT provided by the transmitter 605 to the echo canceller 650. Moreover, the output terminal 606 that carries the output signal ns(t) is NOT coupled to an input terminal of the echo canceller 650.

The cellular modem 100 communicates with a modem 300 of the mobile phone 140 via the hybrid 610, including receiving RETURN signals from the modem 300 that are transformed into the signal rs(t). *See, e.g.*, Figure 1 of Betts, which shows communication

between the modems 100 and 300. The quoted language above further clarifies that the signal rs(t) is indeed being provided from the modem 300, rather than being provided from the modem 100 that includes the echo canceller 650. For example, the quoted language explains that the signal fs(t) is from the modem 300 and is converted into the signal rs(t). Also, Figure 3 illustrates that the signal rs(t) derived from the signal fs(t) is received from the hybrid 610 and was sent from the mobile phone 140 having the modem 300. Column 4, line 65 of Betts further describes the context of the above-quoted language with regards to "Turning now to the other direction of communication..." (emphasis ours), which clarifies that the signal rs(t) is associated with a return signal transmitted from the modem 300, rather than an outgoing signal output from the transmitter 605.

Therefore, it is quite evident that the echo canceller 650 of Betts does NOT receive an analog output signal from the transmitter 605 that includes nonlinearities introduced by the transmitter 605—instead, the echo canceller 650 of Betts receives a signal rs(t) obtained from the modem 300. The distinctions between this feature in Betts and the recited features in the applicants' claims are discussed next.

III. Discussion of the Applicant's Claims

In the embodiment of Figure 3 of the present application, the echo canceller 310 comprises part of the modem 300. As clearly shown in Figure 3, the modem 300 generates an output at 307, which is coupled to an input terminal of the echo canceller 310 and which is also transmitted via a network to another modem 324. The modem 300 includes a transmitter 306, a receiver 304, and the echo canceller 310. The modem 324 includes a transmitter 316 and a receiver 314. In at least some of the applicant's claims, the transmitter 306 of the modem 300 is referred to as the "first transmitter," while the transmitter 316 of the modem 324 is referred to as the "second transmitter." In the follow quoted claim language (emphasis added where appropriate for identification), it is clear that the echo canceller performs echo cancellation based on an analog output signal generated by the first transmitter and having nonlinearities introduced by the first transmitter. The use of proper antecedent basis (as also emphasized in the underlined text below) further clarifies the distinctions discussed above (*e.g.*, the echo canceller 310 receives an input signal generated from an output signal of the first transmitter 306).

In claim 1: "generating an analog output signal by said first transmitter for receipt by said second receiver, the analog output signal including characteristics associated with a nonlinearity introduced by said first transmitter...," and "performing echo cancellation based on said analog output signal that includes the characteristics associated with the nonlinearity...."

In claim 7: "sampling an analog output signal provided by a local transmitter, said analog output signal including characteristics associated with a nonlinearity introduced by said local transmitter...," and "using an echo canceller that receives the sampled analog output signal that includes characteristics associated with the nonlinearity...."

In claim 11 (directed towards a communication "device"): "a transmitter to provide an analog output signal having characteristics associated with a nonlinearity introduced by the transmitter...," and "an echo canceller having an input signal ... [that] is essentially the analog output signal provided by the transmitter and having the characteristics associated with the nonlinearity...."

In claim 17: "generating an analog output signal by said first transmitter for receipt by said second receiver, the analog output signal including characteristics associated with a nonlinearity introduced by the first transmitter...," and "performing echo cancellation based on said sampled analog output signal having the characteristics associated with the nonlinearity...."

In claim 18: "sampling an analog output signal provided by a local transmitter, said analog output signal including ... characteristics associated with a nonlinearity introduced by said local transmitter...," and "using an echo canceller that receives the sampled analog output signal that includes the characteristics associated with the nonlinearity...."

In claim 19 (directed towards a "first" communication "device"): "a transmitter to provide an analog output signal having characteristics associated with a nonlinearity introduced by the transmitter...," and "an echo canceller coupled to an output terminal of the transmitter having an input signal ... [that] is essentially the analog output signal provided by the transmitter and having the characteristics associated with the nonlinearity...." Note also that in Betts, the echo canceller 650 is not coupled to the output terminal of the transmitter 605, while claim 19 specifically recites coupling of the echo canceller to an output terminal of the transmitter.

Accordingly based on the above language in the applicants' claims, the claimed transmitter provides its output signal to the echo canceller, with the output signal having

nonlinearities introduced by the transmitter—this is in contrast to the echo canceller 650 in Figure 3 of Betts, which is not provided with the output signal from the transmitter 605. Agazzi is completely silent with regards to the discussed features. Accordingly, present independent claims 1, 7, 11, and 17-19 are allowable over the cited references.

IV. Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 622-4900.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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